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TECHNICAL MEMORANDUM

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A Study of Psycho-Educational Appraisal by Digital Computer

by

John F. Cogswell

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SYSTEM DEVELOPMENT CORPORATION
2500 COLORADO AVE.
SANTA MONICA
CALIFORNIA

Statement of the Problem

One of the most pressing social problems today is the guidance of our youth. Inadequate education, coupled with the rising level of required technical competence caused by automation, has resulted in a sizable portion of our youth being unemployable. This growing company of unemployed young people is resulting in a number of social ills, of which the increased number of delinquent acts is one of the more apparent.

Attempts to solve the unemployment problem, such as priming the economy by reducing taxes, may increase the number of jobs, and adult training courses supported by the Area Redevelopment Act will provide training for some workers capable of learning more complex skills; but the continued growth of automation will demand greater and greater competence of workers, making the finding of employment ever more difficult for students who drop out of school. To eliminate this waste and actual destruction of human resources, positive, realistic steps must be taken to keep our youth in school, pursuing meaningful education programs.

One of the key points in the educational system where something can be done to decrease dropouts is the guidance program. In schools across the country professional educators designated as counselors are assigned the arduous and important task of helping students make critical decisions about their education and vocation. In fact, the guidance movement is now well established and accepted in our school system. Unfortunately, manpower problems interfere with our reaching all students with the guidance tools and techniques now available.

Manpower problems of the guidance movement follow a particular pattern. Schools fail to budget enough for their guidance programs. Hence, needed counselors cannot be hired; even so, there are too few well-trained counselors to fill the positions that are available. Although well-trained counselors are at a premium, those that are available spend much of their time in repetitive activities. Such problems as these do not lend themselves to easy solutions.

Solutions to the guidance manpower problem are being sought by different groups. Local school districts and state boards of education are seeking additional funds to employ more counselors. The federal government is encouraging and supplementing these efforts. The national organization for counseling--the American Personnel and Guidance Association--is in the process of defining recommendations for training requirements. In addition many states are revising the credential requirements for counselors to raise the minimum level of competence. These programs are all designed to cope with the budget and training problems. One additional way for alleviating the manpower problem would be to provide alternative means for performing the repetitive activities now requiring much of the trained counselor's time.

Purpose of the Study

The purpose of the study proposed in this paper is to develop a demonstrable and wisely applicable means of improving the guidance process by:

1. Developing a computer program to perform the task of psycho-educational appraisal.

2. Explicating and studying the decision-making behavior of counselors in psycho-educational appraisal.

3. Improving the validity of psycho-educational appraisal in counseling.

Central to the behavior of the counselor in "guiding" or counseling youth is the decision-making model that the counselor himself employs in making an appraisal of the student. Although the counselor's skill in providing the best conditions for the decision-making of the student is a critical factor in the counseling process, and needs to be studied further, the appraisal that he makes of the information about the student determines to a large extent what efforts he will use to guide the student. The importance of decision-making in counseling is vividly expressed by Hummel (1962).

> There are facts to be surveyed, feelings to be clarified, alternatives to be considered, decisions to be made and acted upon. One decision may be more appropriate than another; some actions promise consequences more desirable to a counselee than their alternatives.

The appraisal that the counselor makes is based on a large amount of data from such varied sources as grades, tests, teacher ratings, observations of the student, and interviews with the student. The decision-making behavior of the counselor in making the appraisal may be very complex at times, and at other times it may be simple. In any event, the counselor's decision-making certainly goes beyond the reporting of standardized test results and it is usually aimed at trying to understand the student as a unique individual.

Despite the importance of decision-making in the psycho-educational appraisal of students, little research has been conducted to study and develop the process. Methodology for directly attacking the problem has been lacking. The result is that only rough guidelines for making the appraisal have been explicated; therefore, wide variation in the decision-making behavior of counselors is likely. And there is no evidence of the validity of the process.

A new methodology for automating, directly studying, and improving the appraisal process has recently been demonstrated (Kleinmuntz 1963). Kleinmuntz asked ten highly reputed clinical psychologists in the United States to identify the maladjusted students in a sample of 126 students by making a blind analysis of the test profiles from the Minnesota Multiphasic Personality Inventory (MMPI).

The maladjusted students were defined by external criterion information. Forty-five of the students in the sample had either come to the college counseling service to talk about emotional problems or they were identified by at least 60 percent of their fraternity or sorority peers as one of the two most maladjusted in the group. Of the ten experts asked to identify maladjusted students the one achieving the highest hit percentage was selected for intensive study. This expert correctly identified 80 percent of the maladjusted students and 67 percent of the adjusted. The selected expert was asked to analyze the MMPI profiles a second time and to "think aloud" into the tape recorder during the process. The information which was obtained during approximately 30 hours of tape recording was carefully edited, compiled and then programmed into computer language in an attempt to enable an electronic computer to make decisions about profiles similar to the decisions made by the expert. (Kleinmuntz's analysis of the expert's decision-making behavior indicated that he was using 16 logical rules.) The computer model of the expert obtained hit rates of 63 and 88 percent, indicating that the computer program was not a perfect representation of what the clinician was doing, but that it may be a close approximation.

With the decision-making model of the diagnostician explicated in the form of a computer program, Kleinmuntz was able to study and experiment with the model in order to improve its validity. He expanded the model to 35 rules and obtained hit rates of 91 and 84 percent, respectively, for the valid positive and valid negative categories, thus exceeding the performance of the human expert. Kleinmuntz then cross-validated the study by collecting samples from two additional universities. The hit rates for the cross-validation samples were about the same as those obtained by the expert in the original criterion sample.

The Kleinmuntz study clearly demonstrates the value of his method for both studying the decision-making behavior of diagnosticians and improving the validity of the diagnostic task.

The Research Procedure

The approach to be used in this study is to:

(1) Select from a sample of well-trained and experienced counselors, using an empirical selection technique, the counselor or counselors who are able to make the most valid appraisals.

(2) Study and analyze, using the technique demonstrated by Kleinmuntz, the appraisal model of the selected counselors.

(3) Program the Philco S2000 computer to perform or simulate the appraisal behavior of the "experts."

(4) By the method used by Kleinmuntz expand the appraisal model to provide more valid appraisal.

(5) Cross-validate the revised appraisal model with samples of data from five different school districts.

Implications of the Study

The construction of an appraisal model in the form of a computer program will have the following advantages:

a. It will make available on a wide scale an appraisal model that is as good as, or better than, the best human model that could be found.

b. Assuming the use of a computer, the automation of this function of the counseling process will make possible providing an extensive appraisal for every student.

c. Automating this time-consuming task will free counselor time for more personal contacts with the student.

d. By making explicit the decision-making behavior of the counselor at a level of detail and complexity never before provided, the process will be laid open to more thorough examination and study.

e. The explication of the complex model used in guiding students in their educational and vocational plans will provide additional hypotheses regarding the factors that determine success and failure in educational adjustment.

f. The explication of the decision-making process will provide a communicable model of the decision-making process that can be used in the training of counselors.

Bibliography

1. Hummel, Raymond C. Ego counseling in guidance--concept and method, Harvard Educational Review, Vol. 32, No. 4, 1962, pp. 463-481.

2. Kleinmuntz, Benjamin. Personality test interpretation by digital computers, Science, Vol. 139, No 3553, 1963, pp. 416-418.

3. Tugwell, Rexford. High level of jobless to remain (an article in the Los Angeles Times, Sunday, March 31, 1963).

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